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Amdt. Dated , 2004  
Reply to Office Action of Sep. 9, 2004

### **REMARKS**

#### **Claim Objection**

Applicant has amended claim 8 by replacing "occupies" with "occupying," as suggested by Examiner. The objection is now overcome.

#### **Claim Rejections Under 35 U.S.C. 102**

Claims 1-2, 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiu (US 5,858,475).

Examiner states that "Chiu discloses a method for coating photoresist on a substrate comprising: forming grooves/recesses and protrusions on a substrate; applying photoresist on the substrate; and vibrating the substrate so that the photoresist forms a uniform coating over the grooves/recesses and protrusions. Chiu uses an ultrasonic vibrator to vibrate the photoresist coating, and ultrasonic vibration waves would vibrate the substrate in both vertical and horizontal directions..."

In response to this rejection, applicant has canceled claim 6, and amended claims 1 and 7-10. Applicant traverses the rejection as follows:

Amended claim 1 recites "[a] method for coating photoresist on a substrate, comprising the steps of: forming grooves on the substrate; applying photoresist on the substrate; and vibrating the substrate in horizontal directions."

However, Chiu merely discloses a spin coating method coupling an

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ultrasonic wave generator to either the chuck or the spindle of the chuck for improving the planarization of a photoresist, with ultrasonic waves emanating from the ultrasonic generator being induced into the coating and vibrating it. Chiu fails to teach or suggest all the limitations as set out in amended claim 1, and specifically comprising the limitation of **"vibrating the substrate in horizontal directions."**

In other words, the mode and the direction of the vibrating step in Chiu is different from the mode and the direction of the vibrating step to which amended claim 1 of the present invention is directed. Thus Chiu does not teach or suggest a method for coating photoresist comprising all the limitations recited in amended claim 1.

There is nothing in the cited reference that teaches or suggests to one of ordinary skill in the art that it might or should provide the method of amended claim 1. Furthermore, the method of amended claim 1 produces new and unexpected results. That is, the photoresist is evenly distributed. Accordingly, amended claim 1 is submitted to be patentable over Chiu. Reconsideration and withdrawal of the rejection and allowance of amended claim 1 are respectfully requested.

Claims 2 and claim 7 depend directly from amended claim 1, and therefore should also be allowable.

Applicant has amended claims 8 and 10 in similar fashion to the amendment to claim 1. That is, amended claim 8 and amended claim 10 each now comprise the limitation of **"vibrating the substrate in horizontal directions."** Therefore reconsideration and withdrawal of the rejections and allowance of amended claims 8 and 10 are respectfully requested.

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Claim 9 depends from amended claim 8, and therefore should also be allowable.

Claims 1, 4, 7-8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Akram et al (US 5,609,995).

Examiner states that "Akram et al illustrates spraying on the substrate in Figure 3. Akram et al teaches that the substrate is vibrated in vertical direction[s] in col. 5, lines 19-21."

In response to this rejection, applicant has amended claims 1, 7-8, 10, and traverses the rejection as follows.

Amended claim 1 recites "[a] method for coating photoresist on a substrate, comprising the steps of: forming grooves on the substrate; applying photoresist on the substrate; and vibrating the substrate in horizontal directions."

The vibrating directions in Akram are obviously different from the vibrating directions to which amended claim 1 of the present invention is directed. Akram teaches that the substrate is vibrated in vertical directions, whereas amended claim 1 teaches that the substrate is vibrated in horizontal directions. This difference indicates that Akram does not teach or suggest a method for coating photoresist comprising all the limitations recited in amended claim 1.

There is nothing in the cited reference that teaches or suggests to one of ordinary skill in the art that they might or should provide the method of

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amended claim 1. Furthermore, the method of amended claim 1 produces new and unexpected results. That is, the photoresist is evenly distributed. Accordingly, amended claim 1 is submitted to be patentable over Akram. Reconsideration and withdrawal of the rejection and allowance of amended claim 1 are respectfully requested.

Claims 4 and claim 7 depend directly from amended claim 1, and therefore should also be allowable.

Applicant has amended claims 8 and 10 in similar fashion to the amendment to claim 1. Amended claim 8 and amended claim 10 each now comprise the limitation of "vibrating the substrate in horizontal directions." Therefore reconsideration and withdrawal of the rejections and allowance of amended claims 8 and 10 are respectfully requested.

#### **Claim Rejections Under 35 U.S.C. 103**

Claim 4-5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiu as applied to claims 1-2 and 6-10 above, and further in view of Takamori et al (US 6,635,113).

Examiner essentially states that "Chiu discloses coating photoresist on a substrate ..., [but] lacks teaching of how the photoresist coating is applied to the substrate. Takamori et al discloses a method for coating a substrate with photoresist by ... supplying the resist solution using one or more nozzles, including slit nozzles; and then spreading the resist solution by vibrating the substrate to make the film thickness uniform in a horizontal direction (see Figures 11-14 and col. 10, lines 35-60; and col. 12 lines 11-14). It would have been obvious to have used the coating applicator system of Takamori et

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al in the photoresist coating method of Chiu..."

In response to the rejection, applicant respectfully traverses as follows:

Claims 4 and 5 depend directly or indirectly from amended claim 1, and comprise all the limitations of amended claim 1. In particular, claims 4 and 5 each comprise the limitation of "vibrating the substrate in horizontal directions."

As discussed above, Chiu in isolation does not teach a method for coating photoresist comprising all the limitations recited in claim 4 and claim 5. In addition, Takamori merely teaches "spreading the resist solution by vibrating the substrate to make the film thickness uniform in a horizontal direction." That is, Takamori also fails to teach or suggest the limitation of "vibrating the substrate in horizontal directions." as set out in claim 4 and claim 5. Thus Chiu in view of Takamori plainly fails to teach or suggest the limitation of "vibrating the substrate in horizontal directions" as set out in claim 4 and claim 5.

In other words, claim 4 and claim 5 are unobvious and patentable over Chiu in view of Takamori. Reconsideration and withdrawal of the rejections and allowance of claim 4 and claim 5 are respectfully requested.

Claim 11 depends from amended claim 10, and comprises all the limitations of amended claim 10. In particular, claim 11 comprises the limitation of "vibrating the substrate in horizontal directions."

For similar reasons to those asserted above in relation to claims 4 and 5,

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applicant contends that claim 11 is unobvious and patentable over Chiu in view of Takamori. Reconsideration and withdrawal of the rejection and allowance of claim 11 are respectfully requested.

Claim 1-3 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoura et al (US 2003/0053015) in view of Chiu.

Examiner essentially states that "Minoura et al discloses a method of making an array having grooves/recesses and protrusions that are contiguous and parallel to each [other] and which have a triangular cross section...Chiu is cited for its teaching of how to form a uniform resist coating on a non-uniform substrate...It would have been obvious for one having ordinary skill in the art to have used the resist coating and vibrating method of Chiu in order to provide a uniform resist mask coating on the array of Minoura et al..."

In response to the rejection, applicant respectfully traverses as follows:

Amended claim 1 recites "[a] method for coating photoresist on a substrate, comprising the steps of: forming grooves on the substrate; applying photoresist on the substrate; and vibrating the substrate in horizontal directions.

As discussed above, Chiu in isolation does not teach a method for coating photoresist comprising all limitations recited in amended claim 1. In addition, Minoura merely discloses a method of making an array having grooves/recesses and protrusions that are contiguous and parallel to each other and which have a triangular cross section." That is, Minoura also

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fails to teach or suggest the limitation of "vibrating the substrate in horizontal directions" as set out in amended claim 1. Thus Minoura in view of Chiu plainly fails to teach or suggest the limitation of "vibrating the substrate in horizontal directions" as set out in amended claim 1.

In other words, amended claim 1 is unobvious and patentable over Minoura in view of Chiu. Reconsideration and withdrawal of the rejection and allowance of amended claim 1 are respectfully requested.

Claims 2 and 3, 7 depend directly or indirectly from amended claim 1, and therefore should also be allowable.

Applicant has amended claims 8 and 10 in similar fashion to the amendment to claim 1. Amended claim 8 and amended claim 10 each now comprise the limitation of "vibrating the substrate in horizontal directions." For similar reasons to those asserted above in relation to amended claim 1, applicant contends that amended claim 8 and amended claim 11 are unobvious and patentable over Chiu in view of Minoura. Reconsideration and withdrawal of the rejections and allowance of amended claims 8 and 10 are respectfully requested.


Claim 9 depends from amended claim 8, and therefore should also be allowable.

In view of the foregoing, the present application as claimed in the pending claims is considered to be in a condition for allowance, and an action to such effect is earnestly solicited.

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